

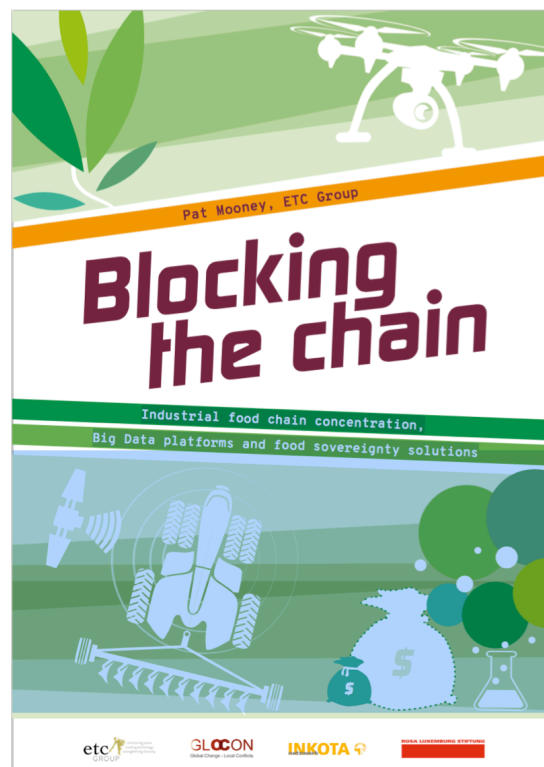
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## Is « Big Data » remodeling our food system?

“Big Data” has become a familiar expression in recent times. But what exactly is behind this expression and what implications will the mechanisms involved in “Big Data” have on food and agriculture? Patterns developing are becoming clearer and it has become possible to give at least a temporary answer to these questions, temporary, because this is a rapidly evolving territory and underlying process are continuously reformatting our economy.

In their recent report “Blocking the chain - Industrial food chain concentration, Big Data platforms and food sovereignty solutions” ETC Group, Glocon, Inkota and the Rosa Luxemburg Stiftung provide a useful understanding of on-going changes, as well as many references for further readings.

Big Data is made of Big Data Platforms, hardware, software, technologies and management/coordination tools.



## Big Data Platforms

Big Data Platforms are places where huge quantities of data are stored and analysed by using sophisticated algorithms with the view to use them for commercial purposes. For the time being, governments have very little control over platforms, for lack of capacity.

Every year or two, the data available is doubling... and the race is accelerating to take advantage of the capacity to analyse this mass of information in order to draw some business advantage, because the ability to analyse data available is a source of decisive advantage over competitors and it can help put some corporations in the position to take control over the others through mergers or acquisitions, thus contributing to further concentrating economic power [[read](#)].

For example, a company having climate projections, soil and crop disease data can be more effective than competitors in adjusting fertilizer composition, seed coatings and characteristics of crop varieties to be used during the next growing season, thus enhancing its clients' trust that will help it gain a larger market share in these areas in the future.

Along food chains, the type of data generated includes data on production, on markets and on consumer preferences. Being able to use simultaneously the data at these different levels provides a decisive advantage, and this is a fantastic incentive for agrifood companies to seek to be present at all the stages of the chain: this means that concentration that is sought is no longer just a horizontal concentration among companies doing the same business (among seed companies, among machinery manufacturers, among traders, etc...) but also a vertical concentration across companies involved in different activities along value chains.

This is a new trend, and whereas governments (or the EU) worry about risks created for competition by horizontal mergers, they have not, so far, bothered much about vertical mergers, and antitrust regulations are not adapted for dealing with such movements that further threaten basic conditions of a fair competition. Among all economic agents active along value chains, it is traders, processors and retailers who appear to be those who are in the best position to take initiatives of vertical integration, and they have already started doing it.

## Hardware

To collect information, companies use hardware such satellites, but also robots with sensors such as drones or driverless tractors. Information is collected by a multitude of other robots - e.g. driverless machines - performing tasks along the value chain while contributing to reduce the reliance on human labour. The design of these robots is often performed by small start-ups that are absorbed by large companies when the time comes to scale up their output.

The drone market is expected to be multiplied by 8 in the next three years and their use is expanding for monitoring of crops, spraying of fields with pesticides, herding of livestock, policing of squatters and deforestation and, soon, for pollinating crops! It is also expected that soon aquadrones will be used to drive shoals of fish into nets or manage huge mobile fish enclosures - capable of holding, for example, more than one million salmons - in the ocean, moving them to places where best conditions can be found to maximise fish growth. In fact, this is already occurring, write the authors of the [report](#), as "*in January 2018, the world's largest mobile fish cage, with the volume capacity of the Vatican and the weight of the Eiffel Tower, was floating up into the North Atlantic toward Norway*".

On the ground, the data generated can be used to implement [precision agriculture](#) on a large scale and reduce production costs by using less agrochemicals and providing them à

*la carte* in quantities adapted to the needs of small land patches - and soon to the needs of individual plants - at critical times.

At the food processing stage of value chains, robots are used for various tasks, including to 3D print sushi rolls, prepare burgers, toss salads or make pizzas.

## **Software**

Evidently, all this hardware requires specific software to do its job. There are now large variety of software available, including those that, using a DNA synthesizer (*“the size of a desktop printer, available on eBay for about US\$400”*), make it possible now - for almost anybody - to produce a sequence of nucleotide that could be plugged into the DNA of an existing plant or animal - a process that requires a much more specific capacity - in order to give it new characteristics, or take an existing DNA sequence and edit it to modify a gene here and there... At the time this article is being drafted, discussions are on-going at the UN Convention on Biological Diversity (CBD) Conference in Sharm-el-Sheikh, Egypt, on whether such edited DNA should be allowed or not to be released in the environment.

## **Technologies**

Such technology could turn *“individual cells into industrial ‘factories’ that could express the smell of roses, the flavor of citrus, the sweetness of stevia or the jolt of caffeine”*. It could also lead to synthetic food and the *“replacement of animals for meat, dairy, hides and medicinal potions”*. The authors quote several examples of application of this technology, including that of a company that challenges the leather industry *“by transforming yeast into a biologically uniform, easily tailored substitute”* of leather.

It is clear that the large-scale use of these technologies would drive out of business millions of farmers and a large number of companies. Vanilla and stevia producers are first in line, and this perspective creates a strong resistance. Emerging pro and con coalitions and the arguments they put forward and that are listed in the report remind those that are described in the novel *“Vert ou le sacrifice de Léa”* published in 2015 (in French only) : fiction has become reality!

Work is also going on for bulkier products like coffee and banana for which climate change creates new opportunities as estimates suggest that in the case of these two items, production may fall in the medium-term (let's recall here that 95% of world banana production relies on only one variety, Cavendish, that is currently under threat of a fungus).

With the fast growing demand for organic food, research on microbial pesticide is now attracting resources from large transnational companies, large agrochemical corporations buying companies specialised in this area.

## **Management and coordination tools**

Simultaneously to the increase of links and interrelations among large transnational corporations, there is a development of technology, such as blockchains, which contribute to reduce costs in managing complex processes as those operating within giants resulting from on-going mergers and acquisitions. Blockchain technology and cryptocurrencies like Bitcoin and Ethereum tend to contribute to further economic concentration, although they can also be used by “smaller players” as shown by experiences in land registration in India and Peru. This technology brings more efficiency, on the one hand, but on the other hand it

consumes a lot of energy and generates a growing part of global greenhouse gas emissions.

## Conclusion

Big Data and related technologies tend to push towards more concentration, including vertical concentration along different stages of value chains. Because of the fundamental change it implies, it is likely that it will lead to the emergence of new giants, as is often the case with new fundamental technological revolutions: big thermic car builders were not involved in managing stagecoaches, and the new car builders that are now in the process of emerging for manufacturing electric and autonomous cars have their origin in other sectors altogether; similarly the agrifood sector is likely to see new actors emerge and old actors disappear in the process.

The authors of the report stress very clearly the dangers of the on-going changes, but they believe that, through a renewed anti-trust regulation, better methods of technology assessment, stronger democratic processes to control data management and through citizen-lead food policies, there are opportunities to orient changes in a way that will support food-sovereignty solutions.

The question is to what extent governments and the international institutions of which they are members will be able to control increasingly huge and powerful corporations. To paraphrase [hungerexplained.org](http://hungerexplained.org)'s motto quoting Antonio Gramsci, we are rather pessimistic if we consider past experience (see for example our recent analysis of privatisation of development assistance where governments are withdrawing and giving more and more weight to private corporations [[read](#)]), and our will to be optimistic can only rely on hope and on citizens' mobilisation...

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To know more :

- Mooney, P., Blocking the chain - Industrial food chain concentration, Big Data platforms and food sovereignty solutions, ETC Group, Glocon, Inkota and the Rosa Luxemburg Stiftung, Berlin and Val David, 2018.

Earlier articles on [hungerexplained.org](http://hungerexplained.org) related to the topic:

- What future for our food? Three scenarios picture quite different futures, 2018.
- Large manoeuvres in the global food system: concentration and financialisation consolidate its industrial nature, 2017.
- A review of two recent publications and of forthcoming studies illustrates EU's thinking on food and agriculture, 2017.
- US Food and Agriculture: present and (perhaps) future situation, 2017.
- How do rich countries see the future of food and agriculture? 2016.

Other readings:

- Maetz, M., Vert ou le Sacrifice de Léa, Roman, Édilivre, 2015 (in French only).